How does the quantum structure of electromagnetic waves describe quantum redshift?

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Abstract

The redshift of the electromagnetic waves is a powerful tool for calculating the distance of the objects in space and studying their behavior. However, physicists' misinterpretation of why Redshift occurs has led us to a misunderstanding of the most cosmological phenomena. The paper introduces Quantum Redshift (QR) by using the quantum structure of the electromagnetic waves (QSEW) In the Quantum Redshift, although the Planck constant is the smallest unit of three-dimensional energy, it is consisting of smaller units of one-dimensional energy. The maximum energy of each period of the electromagnetic waves is equal to the Planck constant hence, the capacity of each period is carrying 89875518173474223 one-dimensional quanta energy. However, in the QR, at the emitting time of the electromagnetic waves, their periods are not fully filled. On the other hand, they are interested in sharing quanta energies with each other to have fully filled periods. Sharing the quanta energies of some periods between other periods is the reason for destroying some periods and decreasing the frequency of the electromagnetic waves. Our other studies show Quantum Redshift can well explain the whole phenomenon of the universe, and real data support our theory. The quantum redshift rejects the big bang theory, expansion of space and dark energy. It predicts dark matters and describes CMB. The paper obtains the basic equation of the QR for use in future papers.

Introduction

Cosmic redshift or shift in spectral lines is a powerful tool for calculating the distance of the objects in the universe. It belongs to the electromagnetic waves area and usually happens when the wavelength of a wave decrease by traveling in space. The measurement parameter of the cosmic redshift is z. The value of the z usually is a positive number, and more distance is equal to the greater z value. In some cases, the value of the z is negative, and we have blueshift.

Although the redshift is known by name of the Edwin Hubble [1], Vesto Slipher (1875-1969) was the first astronomer who measured it [2]. Also, the redshift of the cosmic waves has measured by Carl W. Wirtz (1922) and the Swede Knut Lundmark (in 1924) [3,4].

There are many theories for describing the behavior of the wave in space and increasing its wavelength. Doppler effect is the most similar theory that has been used for investigating the cosmic redshift [5-9]. In the Doppler effect, changing the wavelength is due to changing the distance between emitter and observer during the traveling of the wave between them. In 1848 Hippolyte Fizeau proposed that cosmic redshift is like the Doppler effect. In 1968 William Huggins measured the velocity of the stars by using the Doppler effect formula. According to this

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method, objects that come toward us have the blueshift, while objects that move away have the redshift.

Using spectral lines and the Doppler effect method showed that the speed of some stars and galaxies should be more than the speed of light. This issue disagreed with Einstein's special relativity [13-16]. Hence, the expanding universe theory is proposed. In the expanding space theory, the distance between two objects in space will be increased along time even they do not move. In the expanding space theory, the reason for the redshift of the waves is expanding the space. Also, by increasing the distance between the objects their expansion rate will be increased.

If we accept the expansion of the space, we should find dark energy that makes this expansion. The expanding space theory has two problems. Dark energy is not discovered yet, and not possible to build a realistic model of the universe on modes of unrestrained expansion [17].

The gravitational redshift is another theory that tries to describe the spectral displacement by using general relativity [18-22]. Although there is a significant redshift for massive objects, it is a weak effect for non-massive stars.

The purpose of this work is to represent quantum redshift for measuring the distance of the objects. The quantum redshift disagrees with the accelerated expansion of space. The results of the quantum redshift show the real distances of the objects are less than the distances that have been obtained in the theory of expanding universe. Concepts of the quanta energy [23] and the quantum structure of the electromagnetic waves [24] are the main parts of this paper.

In the quantum structure of the electromagnetic waves, regardless of the frequency of the waves, the capacity of each period of the wave is an equal number of the 89875518173474223 quanta energies. Each period of the wave is called the virtual k box. The number of quanta energies in each period will be changed by traveling in space.

In the quantum structure of the electromagnetic waves, the capacity of each virtual k box (period) is equal to the $q = \bar{c}^2 + \bar{c} + 1$ quanta energies, where $\bar{c} = 299792458$ and [$\bar{c}$]=1. A fully filled period contains one quanta mass in the first dimension, $\bar{c}$ quanta energies in the second dimension, and $\bar{c}^2$ quanta energies in the third dimension.

Fig.1.a demonstrates a virtual cube and free positions for bullets as one-dimensional energies. While in the real world, the distance between the one-dimensional energies (k constants or quanta energies) is not static, in this model we have used static positions for better understanding.

Each cube is an equivalence of one period of the electromagnetic waves. Hence, the frequency is equal to the number of cubes per second. The width and height of the cube are not Fixed. The maximum width of the cube is equal to the value of the speed of light and belongs to an electromagnetic wave with a frequency of 1 Hz.

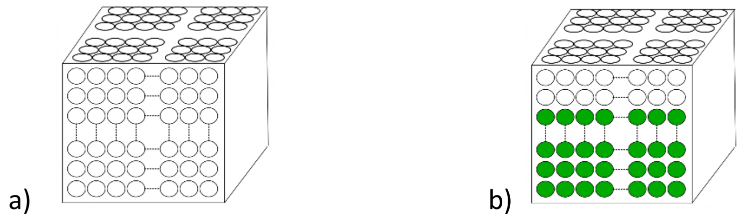

Fig.1: A model for showing the three-dimensional structure of Planck's constant energy, and bullets as the one-dimensional energy in the electromagnetic waves. a) The capacity of Planck's constant for carrying $c^2 + c$ one-dimensional quanta energies in each period plus one quanta mass. b) An unfulfilled period at the emitting time. Each green bullet is one quanta energy.

Fig.2 shows a simple model of the arrangement of k boxes or periods of the waves. The Green positions have been occupied by the one-dimensional quanta energies (k constant). Depending on the mass of the emitter, the number of occupied positions varies. Though the capacity of all k boxes (periods) is constant, the k boxes are not fully filled at the time of emitting.

By accepting the Quantum Redshift, we should replace $E = hf$ by $E = hf * \frac{\text{free space}}{\text{total capacity}}$. The Planck's equation can only calculate the maximum energy of electromagnetic waves due to their quantum structure.

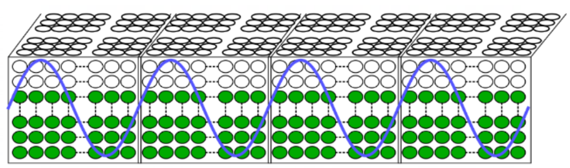

Fig.2: The frequency is equal to the number of cubes per second. The width and height of the cubes are not Fixed. The maximum width of the cube is equal to the value of the speed of light and belongs to an electromagnetic wave with a frequency equal to 1 Hz.

After emitting the electromagnetic waves, all periods are not fully filled, and they are interested in observing quanta energies for fully filling of their free positions. The best candidates are quanta energies in the neighbor periods. The older periods take quanta energies from the near younger periods. The mechanism is time-consuming and depends on the number of free positions and the amount of losing quanta energies over time can take billions of years.

Fig.3 is a simple unreal model to demonstrate the QR mechanism. Sharing of quanta energies of one period between other periods is the reason for the QR. The older periods on the left side observe the quanta energies from the younger period on the right side (a box with red quanta energies). The electromagnetic wave loses its right box while other periods have obtained its quanta energies. As a result of losing some periods, the frequency and number of electromagnetic waves per second will be decreased.

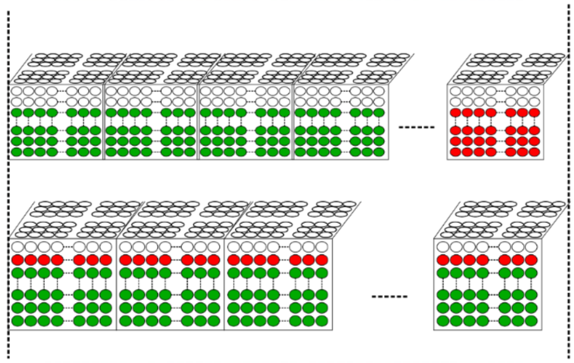

Fig.3: An unreal model for describing sharing quanta energies between periods: All periods are interested in observing quanta energies from the space or neighbor periods. The quanta energies of the right period (Red bullets) share between other periods.

Recursive quantum redshift

The frequency of the wave is equal to the total number of the virtual k boxes (periods) that carry in a second. On the other hand, while k boxes move in a vacuum, in each second, one or more quanta energies will be decreased from new periods for fulling other periods. Hence, in each second, the total number of the decreased quanta energies that have distributed in a second or in 299792458 meters is equal to the frequency of the wave multiplied by the number of the quanta energies that will be decreased in each second from each period. Hence, the total number of sharing and even losing the quanta energies in each second is equal to $f_{t_n} * p$ where p is the number of the quanta energies that will be decreased in each second from each k box, and f_{t_n} is the frequency of the wave at the start of each second.

If result of the $f_{t_n} * p$ be less than the capacity of the k box, the frequency will not be decreased, and this operation will be continued until the sum of the lost (shared) quanta energies for all the k boxes (periods) reaches the capacity of the one period.

After passing t_n seconds, the total number of the shared quanta energies reaches the capacity of one period. Hence, it is an equivalent of destroying one period and send their remain quanta energies to other k boxes (periods), this operation will be decreased frequency of the wave.

The value of the t_n is given by:

$$t_n = \left\lceil \frac{q}{f_{t_n}} \right\rceil \tag{1}$$

where t_n is the counts of the seconds that k boxes lose their quanta energies until the sum of the lost quanta energies reaches the capacity of the one k box (q). Also, If $\mathrm{f_{t_n}} > \mathrm{q}$ then $\mathrm{t_n} = 1$

The equation (1) provides the time for decreasing frequency in each step. The total number of the decreased quanta energies in t_n second is given by:

$$\mathrm{S}_{t_n} = t_n * f_{t_n} * p + R_{t_{n-1}} \tag{2}$$

$$R_{t_0} = 0$$

where S_{t_n} is the total number of the lost quanta energies in the t_n seconds and $R_{t_{n-1}}$ is the remain number of divisions $\frac{S_{t_n}}{q}$ in the previous step ($0 \leq R_{t_{n-1}} < q$).

After passing t_n seconds and reaching the number of the lost quanta energies (S_{t_n}) to the equal or greater than the capacity of the one k box (q), k boxes will be reconstructed, and the wave will be lost some k boxes (periods). Hence, frequency will be decreased. Equation is given by:

$$f_{l_n} = \left\lfloor \frac{S_{t_n}}{q} \right\rfloor \quad (3)$$

where f_{l_n} is the amount of the frequency that will be decreased.

Table.1 illustrates the value of parameters of the quantum redshift in each step and obtain a recursive formula.

Table.1: Parameters of the Recursive quantum redshift in each step.

f_{t_n}	$t_n = \left\lfloor \frac{q}{f_{t_n}} \right\rfloor$	$S_{t_n} = R_{t_{n-1}} + t_n * f_{t_n} * p$ ($R_{t_0} = 0$)	f_{l_n}	$R_{t_n} = S_{t_n} - f_{l_n} * q$	$f_{t_{n+1}} = f_{t_n} - f_{l_n}$
$f_{t_1} = f_{emit}$	$\left\lfloor \frac{q}{f_{t_1}} \right\rfloor$	$S_{t_1} = R_{t_0} + t_1 * f_{t_1} * p$	$\left\lfloor \frac{S_{t_1}}{q} \right\rfloor$	$R_{t_1} = S_{t_1} - f_{l_1} * q$	$f_{t_2} = f_{t_1} - \left\lfloor \frac{S_{t_1}}{q} \right\rfloor$
$f_{t_2} = f_{t_1} - \left\lfloor \frac{S_{t_1}}{q} \right\rfloor$	$\left\lfloor \frac{q}{f_{t_2}} \right\rfloor$	$S_{t_2} = R_{t_1} + t_2 * f_{t_2} * p$	$\left\lfloor \frac{S_{t_2}}{q} \right\rfloor$	$R_{t_2} = S_{t_2} - f_{l_2} * q$	$f_{t_3} = f_{t_2} - \left\lfloor \frac{S_{t_2}}{q} \right\rfloor$
$f_{t_3} = f_{t_2} - \left\lfloor \frac{S_{t_2}}{q} \right\rfloor$	$\left\lfloor \frac{q}{f_{t_3}} \right\rfloor$	$S_{t_3} = R_{t_2} + t_3 * f_{t_3} * p$	$\left\lfloor \frac{S_{t_3}}{q} \right\rfloor$	$R_{t_3} = S_{t_3} - f_{l_3} * q$	$f_{t_4} = f_{t_3} - \left\lfloor \frac{S_{t_3}}{q} \right\rfloor$
$f_{t_n} = f_{t_{n-1}} - \left\lfloor \frac{S_{t_{n-1}}}{q} \right\rfloor$	$\left\lfloor \frac{q}{f_{t_n}} \right\rfloor$	$S_{t_n} = R_{t_{n-1}} + t_n * f_{t_n} * p$	$\left\lfloor \frac{S_{t_n}}{q} \right\rfloor$	$R_{t_n} = S_{t_n} - f_{l_n} * q$	$f_{t_{n+1}} = f_{t_n} - \left\lfloor \frac{S_{t_n}}{q} \right\rfloor$

The results of the equation $\frac{S_n}{q}$ is not an integer number, hence a few numbers of the quanta energies will be remained, and we should consider them in the next step, hence:

$$R_{t_n} = S_{t_n} - f_{l_n} * q \tag{4}$$

on the other hand,

$$f_{t_{n+1}} = f_{t_n} - f_{l_n} \tag{5}$$

where

$$f_{emit} = f_{t_1} \tag{6}$$

so

$$f_{obs} = f_{t_{n+1}} \tag{7}$$

in the quantum redshift

$$f_{t_{n+1}} = f_{t_n} - \left[\frac{S_{t_n}}{q}\right] \tag{8}$$

also

$$f_{t_n} = f_{t_{n-1}} - \left[\frac{S_{t_{n-1}}}{q}\right] \tag{9}$$

so

$$f_{t_{n-1}} = f_{t_{n-2}} - \left[\frac{S_{t_{n-2}}}{q}\right]$$

hence

$$f_{t_{n+1}} = f_{t_{n-1}} - \left[\frac{S_{t_{n-1}}}{q}\right] - \left[\frac{S_{t_n}}{q}\right]$$

so

$$f_{t_{n+1}} = f_{t_{n-2}} - \left[\frac{S_{t_{n-2}}}{q}\right] - \left[\frac{S_{t_{n-1}}}{q}\right] - \left[\frac{S_{t_n}}{q}\right]$$

or

$$f_{t_{n+1}} = f_{t_1} - \sum_{k=0}^{n-1} \left[\frac{S_{t_{n-k}}}{q}\right] \tag{10}$$

using (6) and (7)

$$f_{obs} = f_{emit} - \sum_{k=0}^{n-1} \left[\frac{S_{t_{n-k}}}{q}\right] \tag{11}$$

on the other hand,

$$z = \frac{f_{emit} - f_{obs}}{f_{obs}}$$

using (11)

$$z = \frac{f_{emit} - f_{emit} - \sum_{k=0}^{n-1}\left[\frac{S_{t_{n-k}}}{q}\right]}{f_{emit} - \sum_{k=0}^{n-1}\left[\frac{S_{t_{n-k}}}{q}\right]}$$

so

$$z + 1 = \frac{f_{emit}}{f_{emit} - \sum_{k=0}^{n-1}\left[\frac{S_{t_{n-k}}}{q}\right]} \tag{12}$$

The equation (11) provides the amount of the frequency in the next step based on the frequency of the current step. In the quantum redshift for calculating the distance of a remote galaxy we use the total time of traveling the wave between the galaxy and the observer, the equation is given by:

$$\mathrm{t} = \sum_{i=1}^{n} t_i \tag{13}$$

so

$$d = c * \sum_{i=1}^{n} t_i \tag{14}$$

In the equations (13) and (14) value of the parameter n is not specified at the first. These equations represent recursive procedure; hence we need a computer program that according to the f_{obs} step by step calculate previous frequencies and time of that step until the frequency reaches the f_{emit}.

Approximating recursive quantum redshift to non-recursive quantum redshift

Although environmental parameters such as temperature and mass, have an impact on the parameter p, in a normal space we can use it as a value that will be decreased overtime. Also, the value of the q is invariant. On the other hand, in the equation (4), the amount of the R_{t_n} is too small and we can omit it. Hence, a simple relationship between $f_{t+1}$and f_t in each second is given by:

$$f_{t+1} = f_t - f_t \times \frac{p}{q} \tag{15}$$

where q = 89875518173474223

Hence, t seconds after emitting, f_{obs} would be obtained depend on f_{emit} by using this equation:

$$f_{obs=}f_{emit}\left(1 - \frac{p}{q}\right)^t \tag{16}$$

The equation (16) is a non-recursive quantum redshift.Table.2 shows the changes of the frequency in consequence seconds, respectively.

Table.2: Parameters of the non-Recursive quantum redshift in each step.

Time	Frequency	f_{l_t}	$f_{obs}= f_{emit}$ - f_{l_t}	f_{obs}
1	f_{emit}	$f_{emit} \times \frac{p}{q}$	$f_{emit} - f_{emit_m} \times \frac{p}{q}$	$f_{emit}(1-\frac{p}{q})$
2	$f_{emit}(1-\frac{p}{q})$	$f_{emit}(1-\frac{p}{q}) \times \frac{p}{q}$	$f_{emit}\left(1-\frac{p}{q}\right) -$ $f_{emit}(1-\frac{p}{q}) \times \frac{p}{q}$	$f_{emit}(1-\frac{p}{q})(1-\frac{p}{q})$ $=f_{emit}(1-\frac{p}{q})^2$
3	$f_{emit}(1-\frac{p}{q})^2$	$f_{emit}(1-\frac{p}{q})^2 \times \frac{p}{q}$	$f_{emit}(1-\frac{p}{q})^2 -$ $f_{emit}(1-\frac{p}{q})^2 \times \frac{p}{q}$	$f_{emit}\left(1-\frac{p}{q}\right)^2 \times \left(1-\frac{p}{q}\right)$ $=f_{emit}(1-\frac{p}{q})^3$
t	$f_{emit}(1-\frac{p}{q})^{t-1}$	$f_{emit}(1-\frac{p}{q})^{t-1} \times \frac{p}{q}$	$f_{emit}\left(1-\frac{p}{q}\right)^{t-1} -$ $f_{emit}(1-\frac{p}{q})^{t-1} \times \frac{p}{q}$	$f_{emit}(1-\frac{p}{q})^t$

Calculating time by using frequency

By using the equation of the non-recursive quantum redshift and according to the definition of the parameter z, we can calculate the time distance between the emitter and observer.

$$z = \frac{f_{emit} - f_{obs}}{f_{obs}} \tag{17}$$

using (16)

$$z = \frac{f_{emit} - f_{emit}\left(1-\frac{p}{q}\right)^t}{f_{emit}\left(1-\frac{p}{q}\right)^t} \tag{18}$$

so

$$z = \frac{1-\left(1-\frac{p}{q}\right)^t}{\left(1-\frac{p}{q}\right)^t} \tag{19}$$

or

$$z + 1 = \frac{1}{\left(1-\frac{p}{q}\right)^t} \tag{20}$$

hence

$$z + 1 = \frac{1}{\beta^t} \tag{21}$$

where

$$\beta = 1 - \frac{p}{q} \tag{22}$$

so

$$t = \log_\beta\left(\frac{1}{Z+1}\right) \tag{23}$$

In the normal electromagnetic waves, at the emitting time the value of the p is greater than 1 but after passing time it will be decreased to less than 1. For Instance, with p = 1 and q = 89875518173474223,

$$\beta = 0.99999999999999999888735 \tag{24}$$

Calculating distance by using frequency

The equation (16) represents the relationship between the f_{emit} and f_{obs}.

$$f_{obs=}f_{emit}\left(1 - \frac{p}{q}\right)^t$$

on the other hand,

$$t = \frac{d}{c} \tag{25}$$

hence

$$f_{obs=}f_{emit}\left(1 - \frac{p}{q}\right)^{\frac{d}{c}} \tag{26}$$

so

$$\frac{f_{obs}}{f_{emit}} = \left(1 - \frac{p}{q}\right)^{\frac{d}{c}}$$

or

$$\frac{d}{c} = \log_{\left(1-\frac{p}{q}\right)}\left(\frac{f_{obs}}{f_{emit}}\right)$$

using (22)

$$d = c \times \log_\beta\left(\frac{f_{obs}}{f_{emit}}\right) \tag{27}$$

Calculating distance by using z

Using equations (20) and (25)

$$z + 1 = \frac{1}{\left(1-\frac{p}{q}\right)^{\frac{d}{c}}} \tag{28}$$

or

$$z + 1 = \left(1 - \frac{p}{q}\right)^{-\frac{d}{c}} \tag{29}$$

so

$$-\frac{d}{c} = \log_{\left(1-\frac{p}{q}\right)}(z+1) \tag{30}$$

using (22)

$$d = -c * \log_{\beta}(z+1) \tag{31}$$

Discussion

In the real world, scientists obtain the value of parameter z of the objects in space and calculate their distance to the observer. The equation (14) provides a recursive quantum redshift method for calculating the distance of the objects while the equation (31) represents a non-recursive quantum redshift method. The advantage of the non-recursive quantum redshift method is its higher speed of calculation. For calculating the distance of the object by using the equation (14) we need a computer program and a fast computer, but equation (31) is a simple equation that could be calculated by a professional calculator. The only restriction of the equation (31) is the value of the β or the value of the parameter p. It is not a constant value. Our studies on the real data of more than 90,000 nearby stars show at the begging years after the time of emitting, the value of the p is more than hundreds and its value will be decreased to the less than one after traveling more than millions of years we will publish these results in another paper. For calculating $\log_{\beta}$ we need a calculator that supports this kind of calculation. In this paper for simulating the Quantum redshift we assumed a constant value for the parameter p=1 and in future paper we will discussed in more detail. We have used an online calculator from this internet address https://keisan.casio.com/calculator.

However, we should compare the results of both methods to ensure that the results of the non-recursive quantum redshift method are reliable. For this reason, we wrote a program and calculate the parameter z for distances between zero to almost 8 billion light-years with a constant value for the parameter p = 1. Although choosing a constant value for the parameter p makes an inaccurate distance, we can use it for comparing recursive and no recursive methods. This range of distances covers z parameters between zero and 12. In the table.3 the columns (1) and (2) represent the relation between the special distances and their z value in the recursive quantum redshift, respectively.

In the next step, we used all z parameters in column (2) for calculating the distances of the objects in equation (31). The results have been shown in column (3). The difference between the two methods is too small, and less than $1 * 10^{-5}$ percent, hence results of the non-recursive quantum method are reliable.

Another thing that we should consider is the value of the β. Although, the value of the q is invariant (q = 89875518173474223), the value of the p is not constant. The parameter p is the average number of quanta energies that each individual period of the wave loses in each second at the time t, and it could mainly depend on the mass of the emitter and a little on the environmental parameters such as the temperature of the space. We should consider that p is the average number of the decreased quanta energies in a second.

We should consider that result in the quantum redshift disagrees with the accelerated expansion universe theory, hence the distances that would be obtained from each value of the parameter z by the quantum redshift would be less than the distances that have been calculated by the accelerated expansion universe method

Table.3: Comparing distances in the Recursive quantum redshift and non-Recursive quantum redshift.

Quantum redshift		
Recursive (Light Year)	z	non-Recursive (Light Year)
0	0	0.00
200000000	7.27496578431443E-02	199,999,996.17
400000000	0.150791769911269	399,999,847.59
600000000	0.234511509968063	599,999,918.85
800000000	0.324321765161994	799,999,840.27
1000000000	0.420665803908163	1,000,000,003.75
1200000000	0.524018677229894	1,199,999,854.50
1400000000	0.634890525686787	1,399,999,870.08
1600000000	0.753828278288702	1,599,999,908.87
1800000000	0.881418650808816	1,799,999,852.61
2000000000	1.01829126919994	1,999,999,926.79
2200000000	1.16512135640523	2,200,000,038.65
2400000000	1.32263320410299	2,400,000,046.88
2600000000	1.4916040729006	2,600,000,154.96
2800000000	1.67286727326276	2,799,999,998.31
3000000000	1.86731773894792	3,000,000,278.65
3200000000	2.07591394054181	3,200,000,105.53
3400000000	2.29968547810483	3,399,999,972.96
3600000000	2.53973686481081	3,600,000,288.70
3800000000	2.79725145446597	3,800,000,242.78

Quantum redshift		
Recursive (Light Year)	z	non-Recursive (Light Year)
4000000000	3.07350020087448	4,000,000,240.60
4200000000	3.36984631250519	4,200,000,475.17
4400000000	3.68775041010491	4,400,000,030.00
4600000000	4.02878349955558	4,600,000,508.16
4800000000	4.39462526741326	4,800,000,234.50
5000000000	4.78708308587525	5,000,000,563.39
5200000000	5.20809053879242	5,200,000,164.35
5400000000	5.65972667649254	5,400,000,021.60
5600000000	6.14421900960585	5,599,999,816.89
5800000000	6.66395841536164	5,799,999,782.31
6000000000	7.22150797871657	5,999,999,505.14
6200000000	7.8196205688986	6,199,999,726.63
6400000000	8.46124702783795	6,400,000,348.99
6600000000	9.14954723504131	6,599,999,706.28
6800000000	9.88792379542136	6,799,999,825.86
7000000000	10.6800171696252	6,999,999,978.93
7200000000	11.529738551343	7,200,000,913.62
7400000000	12.4412667049743	7,399,999,630.26

Fig.4 illustrates the relationship between distances and their z parameters in the quantum redshift theory. By increasing the distance, the z will be increased more. Meanwhile, this graph shows that the percent of the increase in the z parameter is more than the increasing percentage of the distance even with a constant value of the parameter p. This agrees with the real data of the universe.

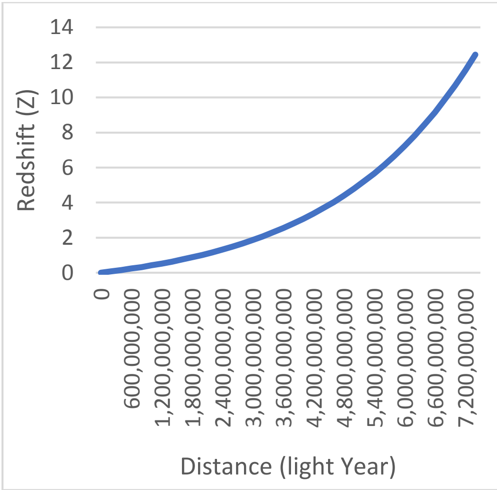

Fig.4: distances and their z parameters in the quantum redshift

Conclusion

Quantum redshift claims the reason for redshift is the existence of free energy capacity in the periods of the electromagnetic waves, and they're interested in obtaining quanta energies for full filling. After the time of emitting, the older periods absorb quanta energies from the younger periods continuously. Sharing the quanta energies along with traveling in space is the main reason for destroying some periods and decreasing the frequency of the waves.

The relationship between the f_{emit} and f_{obs} is given by:

$$f_{obs=}f_{emit}\left(1-\frac{p}{q}\right)^{t}$$

where q = 898755178173474223 and the parameter p is not a constant value, and its initial value depends on the mass of the emitter. In the begging years after the time of emitting, the value of the p is more than hundreds and its value will be decreased to less than one after traveling more than millions of years.

Observational evidence supports the QR theory. In a future paper, we will show that data of 93,060 nearby space objects show an agreement with the Quantum Redshift theory. The Quantum Redshift rejects the accelerating expansion of the universe and dark energy. The QR theory not only can describe the reason for the Redshift but prove a higher rate of increasing Redshift of the distant objects.

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